

QUALITY ASSURANCE PROJECT PLAN
Hovensa Flare Release
St. Croix, US Virgin Islands

Prepared for:
United States Environmental Protection Agency/Environmental Response Team
Edison, New Jersey

By:
Lockheed Martin/Scientific, Engineering, Response and Analytical Services
Work Assignment Number: SERAS-116

Based on the Intergovernmental Data Quality Task Force Uniform
Federal Policy for Quality Assurance Project Plans
(Final Version 1.1, June 2006)

November 12, 2010

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QAPP Worksheet #1
Title and Approval Page

Site Name/Project Name: Hovensa Flare Release
Site Location: St. Croix, US Virgin Islands

Document Title: Quality Assurance Project Plan for Hovensa Flare Release

Lead Organization: Environmental Protection Agency/Environmental Response Team (EPA/ERT)


Preparer's Name and Organizational Affiliation: Philip Solinski, Lockheed Martin/Scientific, Engineering, Response and Analytical Services (SERAS)

Preparer's Address, Telephone Number, and E-mail Address: 2890 Woodbridge Avenue, Edison, New Jersey 08837, (732) 321-4283, philip.j.solinski@lmco.com

Preparation Date (Month/Day/Year): November 12, 2010

Investigative Organization's Project Manager/Date: 
Signature

Printed Name/Organization: Philip Campagna/ERT Work Assignment Manager

Investigative Organization's Project QA Officer/Date:  11/14/10
Signature

Printed Name/Organization: Stephen Blaze/ERT Quality Coordinator

Lead Organization's Project Manager/Date:  11/12/10
Signature

Printed Name/Organization: Philip J. Solinski/SERAS Task Leader

Approval Signatures/Date:  11/12/10
Signature

Printed Name/Title: Deborah Killeen/SERAS QA/QC Officer

Approval Authority: SERAS

Other Approval Signatures/Date:  11/12/10
Signature

Printed Name/Title: Dennis A. Miller/SERAS Program Manager

Document Control Numbering System : SERAS-116-DQAPP-111210

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QAPP Worksheet #2

QAPP Identifying Information

Site Name/Project Name: Hovensa Flare Release

Site Location: St. Croix, US Virgin Islands

Site Number/Code: NA

Operable Unit:

Contractor Name: Lockheed Martin

Contractor Number: EP-W-09-031

Contract Title: SERAS

Work Assignment Number: 0-116

1. Identify regulatory program: Comprehensive Environmental Response and Compensation Liability Act (CERCLA)
2. Identify approval entity: EPA/ERT FOR EPA Region II
3. The QAPP is (select one): Generic ☒ Project Specific
4. List dates of scoping sessions that were held: 11/9/2010
5. List dates and titles of QAPP documents written for previous site work, if applicable:

Title	Approval Date

6. List organizational partners (stakeholders) and connection with lead organization:
EPA Region II
7. List data users:
EPA Region II
8. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusions below:

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Project Management and Objectives		
2.1 Title and Approval Page	- Title and Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications Table - Special Personnel Training Requirements Table	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria Table	11 12

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QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
2.7 Secondary Data Evaluation	<ul style="list-style-type: none"> - Sources of Secondary Data and Information - Secondary Data Criteria and Limitations Table 	13
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	<ul style="list-style-type: none"> - Summary of Project Tasks - Reference Limits and Evaluation Table - Project Schedule/Timeline Table 	14 15 16
Measurement/Data Acquisition		
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.3 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.4 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	<ul style="list-style-type: none"> - Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/SOP Requirements Table - Analytical Methods/SOP Requirements Table - Field Quality Control Sample Summary Table - Sampling SOPs - Project Sampling SOP References Table - Field Equipment Calibration, Maintenance, Testing, and Inspection Table 	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	<ul style="list-style-type: none"> - Analytical SOPs - Analytical SOP References Table - Analytical Instrument Calibration Table - Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table 	23 24 25

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QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Required Documents
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	26 27
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples Table - Screening/Confirmatory Analysis Decision Tree	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records Table - Analytical Services Table - Data Management SOPs	29 30
Assessment/Oversight		
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table	31 32
4.2 QA Management Reports	- QA Management Reports Table	33
4.3 Final Project Report		

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Data Review		
5.1 Overview		
5.2 Data Review Steps	- Verification (Step I) Process Table	34
5.2.1 Step I: Verification		
5.2.2 Step II: Validation	- Validation (Steps IIa and IIb) Process Table	35
5.2.2.1 Step IIa Validation Activities		
5.2.2.2 Step IIb Validation Activities	- Validation (Steps IIa and IIb) Summary Table	36
5.2.3 Step III: Usability Assessment		
5.2.3.1 Data Limitations and Actions from Usability Assessment	- Usability Assessment	NA
5.2.3.2 Activities		
5.3 Streamlining Data Review		
5.3.1 Data Review Steps To Be Streamlined		
5.3.2 Criteria for Streamlining Data Review		
5.3.3 Amounts and Types of Data Appropriate for Streamlining		

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**QAPP Worksheet #3
Distribution List**

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Philip Campagna	Work Assignment Manager (WAM)	ERT	(732) 321-6689	(732) 321-6724	campagna.philip@epamail.epa.gov	SERAS-116-DQAPP-111210
Stephen Blaze	Quality Coordinator	ERT	(732) 906-6921	(732) 321-6724	blaze.stephen@epamail.epa.gov	SERAS-116-DQAPP-111210
Philip Solinski	Task Leader	SERAS	(732) 321-4283	(732) 494-4021	philip.j.solinski@lmco.com	SERAS-116-DQAPP-111210
Deborah Killeen	QA/QC Officer	SERAS	(732) 321-4245	(732) 494-4021	deborah.a.killeen@lmco.com	SERAS-116-DQAPP-111210
Dennis A. Miller	Program Manager	SERAS	(732) 321-4216	(732) 494-4021	dennis.a.miller@lmco.com	SERAS-116-DQAPP-111210

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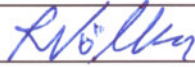
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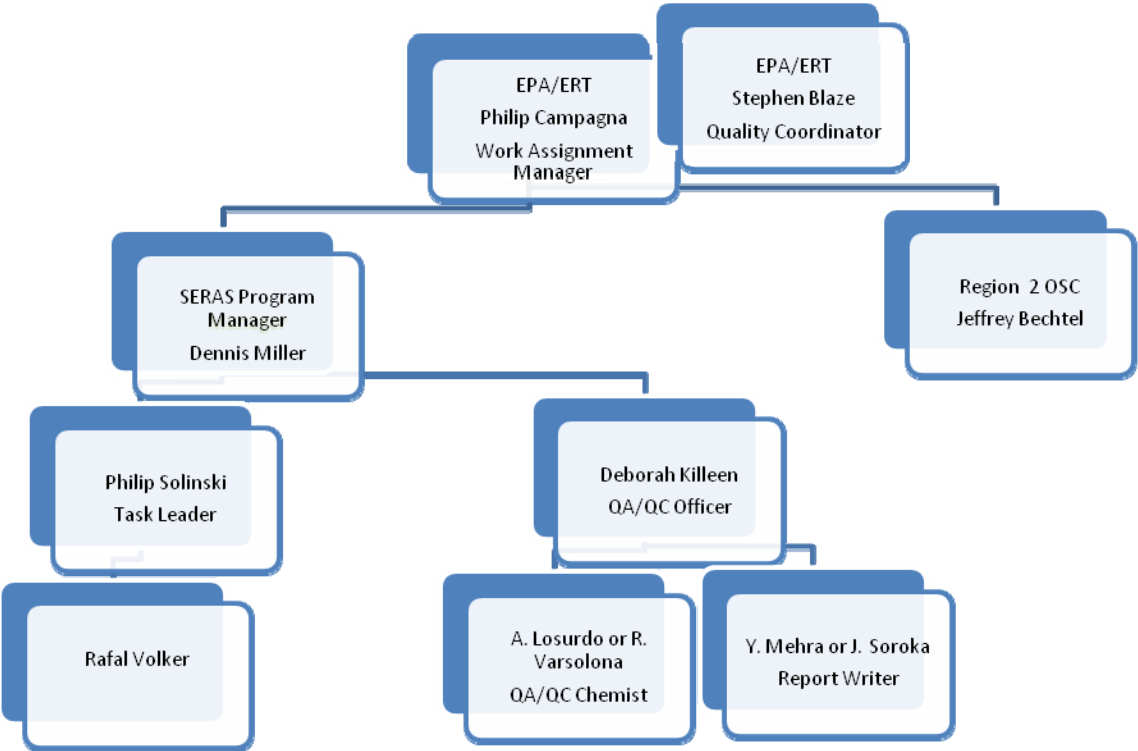
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QAPP Worksheet #4
Project Personnel Sign-Off Sheet

Organization: SERAS/ERT/EPA R2

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Philip Solinski	SERAS Air Response Chemist	(732) 321-4283		11/12/10
Philip Campagna	ERT WAM	(732) 321-6689		
Jeff Bechtel	EPA Region II On-Scene Coordinator (OSC)	(908) 420-4459		
Rafael Cody Volker	SERAS Environmental Scientist	(732) 321-4278		01/11/11/12/10

QAPP Worksheet #5
Project Organizational Chart



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QAPP Worksheet #6
Communication Pathways

<u>Communication Drivers</u>	<u>Responsible Entity</u>	<u>Name</u>	<u>Phone Number</u>	<u>Procedure (Timing, Pathways, etc.)</u>
Approval of initial QAPP and any amendments	ERT Work Assignment Manager ERT Quality Coordinator SERAS Program Manager SERAS QA/QC Officer SERAS Task Leader	Philip Campagna Stephen Blaze Dennis A. Miller Deborah Killeen Philip Solinski	(732) 321-6689 (732) 906-6921 (732) 321-4216 (732) 321-4245 (732) 321-4283	SERAS internal peer review, followed by ERT approval, implementation of changes effective only with approved QAPP or QAPP Change Form.
Nonconformance and Corrective Action	SERAS Task Leader SERAS Environmental Scientist ERT Work Assignment Manager SERAS QA/QC Officer	Philip Solinski Rafal Volker Philip Campagna Deborah Killeen	(732) 321-4283 (732) 321-4200 (732) 321-6689 (732) 321-4245	Use of the Work Assignment Field Change Form for field issues. Use of the
Posting of Deliverables to the ERT-IMS website	SERAS Task Leader SERAS QA/QC Officer SERAS Administrative Support	Philip Solinski Deborah Killeen Eileen Ciambotti	(732) 321-4283 (732) 321-4245 (732) 321-4255	As per work assignment, posting of deliverables to ERT_IMS website constitutes delivery to the Work Assignment Manager.
Work Assignment	SERAS Program Manager	Dennis A. Miller	(732) 321-4216	Describes scope of work to SERAS personnel from the ERT Work Assignment Manager.
PWA/ASRR	SERAS Task Leader	Philip Solinski	(732) 321-4283	Filled out by the Task Leader upon receipt of the work assignment and following the project scoping meeting, and distributed to field, analytical, and support personnel.
Health and Safety On-Site Meeting	SERAS Task Leader and/or Site Health and Safety Officer	Philip Solinski	(732) 321-4283	Describe potential site hazards, required personal protective equipments, and access to local emergency services.

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QAPP Worksheet #7
Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Philip Solinski	Air/Response Chemist/Task Leader	SERAS	Project Supervision/Sampling Operations/Site Health and Safety Officer	Minimum BS degree plus 14 years related experience/Lockheed Martin Employee Files
Deborah Killeen	QA/QC Officer	SERAS	QA Oversight/Deliverable Review	Minimum BS degree plus 14 years related experience/Lockheed Martin Employee Files
Raymond Varsolona or Antonio LoSurdo	QA/QC Chemist	SERAS	Data Validation	Minimum BS degree plus 8 years related experience/Lockheed Martin Employee Files
Yash Mehra or Joseph Soroka	Report Writer	SERAS	Analytical Report & Electronic Data Deliverable (EDD) Preparation	Minimum BS degree plus 8 years related experience/Lockheed Martin Employee Files
John Syslo	GC/MS Chemist	SERAS	Sample Analysis	Minimum BS degree plus 14 years related experience/Lockheed Martin Employee Files
Shiv Sahni	Extraction Chemist	SERAS	Sample Analysis	Minimum BS degree plus 8 years related experience/Lockheed Martin Employee Files
Vinod Kansal	GC/MS Chemist	SERAS	Data Review/Lab Oversight	Minimum BS degree plus 8 years related experience/Lockheed Martin Employee Files
Philip Campagna	Work Assignment Manager	ERT	Project Oversight/Technical Support	EPA job-related qualifications/EPA Employee Files
Stephen Blaze	Quality Coordinator	ERT	QA Oversight	EPA job-related qualifications/EPA Employee Files
Jeff Bechtel	OSC	EPA Region 2	Technical Oversight/Access Issues	EPA job-related qualifications/EPA Employee Files

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QAPP Worksheet #8
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	<u>Location of Training Records/Certificates</u>
Project Oversight	Task Leader	REAC	2002	Philip Solinski	Task Leader/SERAS	Quality Files
Site Health & Safety	OSHA 8-hour refresher	SERAS	Sept 2010	Philip Solinski	Site Safety Supervisor/SERAS	Health & Safety Files
QA Oversight	Lead Auditor Training	IT Corp	Sept 1991	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Data Review & Validation	Laboratory Data Consultants	January 2007	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	Advanced Systems	January 2006	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight Lab Oversight	Changes to Environmental Laboratory Accreditation	Advanced Systems	May 2009	Deborah Killeen Vinod Kansal	QA/QC Officer/SERAS GC/MS Chemist/SERAS	Quality Files
TPH Analysis	Demonstration of Capability Annual Data Integrity Training/Peak Integration Training	SERAS	November 2009 July 2010	Shiv Sahni John Syslo	Extraction Chemist/SERAS GC/MS Chemist/SERAS	Quality Files

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QAPP Worksheet #9
Project Scoping Session Participants Sheet

Project Name: St. Croix Cistern Sampling (WA# SERAS-116) Projected Date(s) of Sampling: Week of 11/16/10 Project Manager: Phil Solinski				Site Name: St. Croix Cistern Sampling Site Location: St. Croix	
Date of Session: 11/9/10 Scoping Session Purpose: Discuss mobilization to St. Croix for cistern sampling					
Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Phil Solinski	Air Response Chemist	SERAS	732-321-4283	Philip.j.solinski@lmco.com	Task Leader
Ray Varsolona	Acting as QA/QC Officer	SERAS	732-321-4245	raymond.a.varsolona@lmco.com	QA/Validation Oversight
Rafal Volker	Environmental Scientist	SERAS	732-321-4278	cody.r.volker@lmco.com	Field Sampler
Misty Barkley	Property Coordinator	SERAS	732-321-4205	Misty.barkley@lmco.com	Analytical Subcontracting
Vinod Kansal	GC/MS Chemist	SERAS	732-321-4252	Vinod.c.kansal@lmco.com	ERT/SERAS Lab Support

Comments/Decisions: Up to 35 water samples will be collected from cisterns in the vicinity of an active facility which has had accidental air releases. Analysis is to be performed in accordance with the SERAS Draft SOP #1803, *Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM*. One liter samples will be collected from each cistern, either directly or using dedicated Teflon bailers. Matrix Spike/Matrix Spike Duplicates (MS/MSD) will be collected at a rate of 1 per 20 samples. Each MS/MSD will consist of triple the volume (3 liters). It is anticipated that 2 MS/MSDs will be collected for this project. Duplicate samples will be collected at a rate of 1 per 20 samples. Each duplicate sample will consist of another 1 liter sample collected from the same spot. It is anticipated that 2 duplicate samples will be collected for this project.

Action Items: The Analytical Support Leader needs to make a decision on whether to keep these samples in-house or contract them out.

Consensus Decisions: Samples will be analyzed in-house in accordance SERAS Draft SOP #1803, *Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM*.

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QAPP Worksheet #10

Problem Definition

<p>The problem to be addressed by the project: On September 30, 2010 at approximately 0650, Hovensa, LLC experienced an upset of a process unit that caused a release of heavy oil to be sent to the High Pressure Flare that safely combusted the heavy oil. On or about 0915 on the same day, an electrical upset in the refinery occurred causing some process units to shut down resulting in gases being sent to the Low Pressure Flare causing the release of heavy oil into the atmosphere and surrounding neighborhoods through incomplete combustion during process "upset." This resulted in oil droplets (spotting) reaching the airport and at least four surrounding neighborhoods. HOVENSA crews are conducting assessment as to impact and related removal of hydrocarbons from residential cisterns. United States Coast Guard (USCG), HOVENSA and Virgin Islands Department of Planning and Natural Resources (DNPR) crews could not find evidence of sheen.</p>
<p>The St. Croix Cistern Sampling Site (SITE) is located in Estate Hope, Christiansted, St. Croix). The area has been under investigation by the EPA and the Virgin Islands Department of Planning and Natural Resources since two accidental air releases in September 2010. There is a concern that deposits from these releases could migrate into individual homeowner private drinking water supplies. Water from the individual home cisterns or barrels will be sampled by SERAS personnel to identify the potential and current exposure associated with release.</p>
<p>The environmental questions being asked: Are petroleum hydrocarbons from the release impacting individual home drinking supplies, and if so, does the concentrations exceed the site-specific action level established by EPA Region II?</p>
<p>Observations from any site reconnaissance reports: N/A</p>
<p>A synopsis of secondary data or information from site reports: The petroleum product that was emitted into the atmosphere is known in the refining industry as "Cat Cracked Slurry Oil" but is commonly referred to as #6 Fuel Oil, Residual Fuel Oil, or Heavy Fuel Oil. It is a complex mixture of hydrocarbons produced by the distillation of petroleum from the Fluidized Catalytic Cracking (FCC) process. The US Virgin Islands Department of Health has issued a public health advisory cautioning residents to refrain from drinking cistern water in the wake of the release.</p>
<p>The possible classes of contaminants and the affected matrices: Petroleum hydrocarbon contamination (C8 to C40) of cistern water impacting individual residential drinking water supplies (cisterns/barrel water).</p>
<p>The rationale for inclusion of chemical and nonchemical analyses: Documented release of contaminants to the atmosphere.</p>
<p>Information concerning various environmental indicators: NA</p>
<p>Project decision conditions ("If..., then..." statements): If the TPH concentrations in the water sampled from the cisterns exceed the guidance levels specified in Worksheet #15, then the EPA Region 2 in conjunction with the Virgin Islands DPNR will determine the appropriate course of action for cleaning and/or draining the cisterns and removing the drinking water ban.</p>

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QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements

Who will use the data? EPA Region II
What will the data be used for? Data will be provided to EPA Region II so they may assess the potential cistern water contamination.
What type of data is needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques) Petroleum hydrocarbons by draft SERAS SOP #1803, <i>Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM</i> .
How “good” do the data need to be in order to support the environmental decision? Data must meet definitive data requirements. The quantitation levels are specified in Worksheet #15. All laboratory analyses will be performed by the SERAS Labs. Worksheets #12 and #28 show the measurement performance criteria that are needed for the quality indicators. Worksheet #20 outlines the quality control (QC) samples required. All analytical data will also be validated by the SERAS Contract.
How much data are needed? (number of samples for each analytical group, matrix, and concentration) Up to thirty units will have their cisterns/water barrels sampled. One 1-liter sample will be collected from each homes collection system.
Where, when, and how should the data be collected/generated? Residential/commercial buildings during the week of November 15, 2010 in accordance with SOP #2013, <i>Surface Water Sampling</i> .
Who will collect and generate the data? Samples will be collected by and analyzed by SERAS personnel.
How will the data be reported? Validated data will be reported in a final analytical report prepared in accordance with SERAS SOP #4020, <i>Analytical Report Preparation</i> . A final Trip Report prepared in accordance with SERAS SOP #4017, <i>Preparation of Trip Reports</i> will be the final deliverable to the EPA/ERT WAM. Data will be disseminated to EPA Region II by the ERT WAM.
How will the data be archived? Hard copy will be stored in SERAS Central Files and e-copies will be stored on SERAS Local Area Network (LAN). Data will be imported into a Scribe database and posted to the ERT-IMS website. Data will be archived by SERAS in accordance with AP #34, <i>Archiving Electronic Files</i> .

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☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #12 Measurement Performance Criteria Table

Matrix	Water				
Analytical Group	Total Petroleum Hydrocarbons (TPHs)				
Concentration Level	Low				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2013	SERAS SOP #1803	Accuracy/Bias	%R = 60-140%	LCS	A
		Precision	RPD \pm 20%	MS/MSD	A
				Field Duplicate	S&A
		Accuracy/Bias	%R = 50-150%	Matrix Spike	A
			%R = 50-150%	Surrogates (d10-Anthracene, 5 α -Androstane, d62-Triacontane, d14-o-Terphenyl)	A
		Accuracy/Bias (Contamination)	<RL	Method Blank	A
				Field (Bottle) Blank	S&A
		Accuracy/Bias	%R = 50-200%	Internal Standards (Phenanthrene-d10, 30-n-Tetradecane, d50-Tetracosane, d74-n-Hexatriacontane)	A
		Completeness	90% of lab data acceptable	Data Completeness Check	A

¹Reference number from QAPP Worksheet #21 (see Section 3.1.2)

²Reference number from QAPP Worksheet #23 (see Section 3.2)

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QAPP Worksheet #13
Secondary Data Criteria and Limitations Table

<u>Secondary Data</u>	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
September 30, 2010 LP Flair Incident	September 30, 2010 LP Flair In- cident	Hovensa	Site History	Background information
Public Health Advisory	Public Health Advisory September 9, 2010	VI DPNR	Site History	Background information
Petroleum Hydrocarbons	Massachusetts Department of Environmental Protection	MassDEP	Current TPH Regulatory Limit	Guidance values for TPH in drinking water since no federal or local standards exist

QAPPWorksheet#14 **Summary of Project Tasks**

<p>Sampling Tasks: Up to 35 water samples will be collected from cisterns in the vicinity of an active facility, which had accidental air releases. A 1-liter (L) sample will be collected from each cistern, either directly or using dedicated Teflon bailers.</p>
<p>Analysis Tasks: Analysis of all samples collected will be performed by the ERT/SERAS Laboratory in accordance with draft SERAS SOP #1803, <i>Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM</i>.</p>
<p>Quality Control Tasks: Matrix Spike/Matrix Spike Duplicates (MS/MSD) will be collected at a rate of 1 per 20 samples. Each MS/MSD will consist of triple the volume (3 liters). It is anticipated that two MS/MSDs will be collected for this project. Field duplicate samples will be collected at a rate of 1 per 20 samples. Each duplicate sample will consist of another 1 liter sample collected from the same cistern/barrel. It is anticipated that two duplicate samples will be collected for this project. Field QC samples are described in Worksheet #20. Analytical QC samples are outlined in Worksheets 12 and 18. QC samples will be collected in accordance with SERAS SOP #2005, <i>Quality Assurance/Quality Control Samples</i>.</p>
<p>Secondary Data: Will be used by EPA Region II to determine units to be sampled.</p>
<p>Data Management Tasks: All samples will be assigned a unique location identifier. Field sampling data will be recorded on field data sheets or in field logbooks, and entered into Scribe database software during sampling activities. All samples will be delivered under chain of custody (COC) to the ERT/SERAS laboratory. Laboratory procedures will be reviewed and the data verified for the appropriate quality assurance objectives. All deliverables will be generated in accordance with the appropriate SERAS SOP and posted to the ERT/Information Management System (IMS) website upon completion. Posting to the ERT-IMS site will be considered as completion of the deliverable.</p>
<p>Documentation and Records: All documentation will be recorded in accordance with SERAS SOP #4001, <i>Logbook Documentation</i> and SOP #2002, <i>Sample Documentation</i>. All Analytical Reports will be prepared in accordance with SERAS SOP #4020, <i>Analytical Report Preparation</i>. The Trip Report will provide a description of the project; field and laboratory methodologies and results, and will be prepared in accordance with SERAS SOP #4017, <i>Preparation of Trip Reports</i>. Documents and records that may be generated during this project include: WP, QAPP, HASP, Field and Laboratory Logbooks, Site Map, Sample Labels, COC Records, Custody Seals, Sampling Work Sheets, Projected Work Assignment (PWA), Data Review Records, Data Reduction Records, Data Assessment Forms (for definitive data), Data Validation Records (for definitive data), Instrument Printouts, Laboratory Analytical Reports, Scribe Database, Final Trip Report, Final Analytical Report, Field Change Form (if required)</p>
<p>Assessment/Audit Tasks: No performance audits of field operations are anticipated for this project. The tasks associated with this QAPP are assessed using peer reviews and management system reviews. Peer review enables the field chemist to identify and correct reporting errors before reports are submitted. Management system reviews establish compliance with prevailing management structure, policies and procedures, and ensures that the required data are obtained.</p>
<p>Data Review Tasks: Analytical data will be validated in accordance with draft SERAS SOP #1803, <i>Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM</i> and draft SERAS SOP #1016, <i>Data Validation Procedures for Routine Semivolatile Organic Analysis</i>. All project deliverables will receive an internal peer review prior to release, per guidelines established in the REAC AP #22, <i>Peer Review of REAC Deliverables</i>.</p>

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QAPP Worksheet #15
Reference Limits and Evaluation Table

Matrix: Water

Analytical Group: TPH

Concentration Level: Low

Analyte	CAS Number	Project Action Limit ³ (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method Draft SERAS SOP #1803		Achievable Laboratory Limits	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs ¹ (µg/L)	QLs ² (µg/L)
TPH	8002-5-9	See next page	50	NS	100	22.6	50

¹ MDL Study run on Slick 2 instrument dated 10/23/09

²Based on 1 liter of sample

³ <http://www.mass.gov/dep/water/drinking/standards/pethydro.htm>

NS = Not Specified

PETROLEUM HYDROCARBONS [17]

CASRN: Various CASRN numbers for different chemical species

Update: May 2004

Current Massachusetts Regulatory Limit: Carbon number fraction-specific ORSGLs are presented below:

Aliphatics (mg/L)		Aromatics (mg/L)	
C5-C8	0.3	C9-C10	0.2
C9-C12	0.7	C11-C22	0.2
C9-C18	0.7		
C19-C36	14.0		

Federal Regulatory Limit: The U.S. EPA has not published an MCL for petroleum hydrocarbons as a class.

Basis for Criteria: The ORSGLs for petroleum hydrocarbons were originally based on the approach described in the Interim Final Petroleum Report: Development of Health-Based Alternative to the Total Petroleum Hydrocarbon Parameter (MassDEP, 1994). This approach essentially grouped the list of component chemicals in petroleum by carbon number (i.e., carbon number fraction) and designated a "reference compound" for each range of compounds usually chosen because its toxicity is relatively well characterized. For each reference compound, a U.S. EPA oral Reference Dose (RfD) was identified or, for reference compounds without U.S. EPA published values, an oral dose-response value was developed from available toxicity information.

An update to the toxicity values was published in November 2003 (MassDEP, 2003). The updated values were used to derive the current ORSGLs. The updated derivation uses toxicity studies on mixtures corresponding to these fractions to develop these fraction-specific values.

The toxicity values are used together with standard drinking water assumptions (a 70-kg adult drinks 2 liters of water per day) to back-calculate fraction-specific drinking water guidelines.

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☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #16
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Field Activities	SERAS	11/15/10	11/24/10	Trip Report	21 Business Days (BD) after receipt of Final Analytical Report
Sample Analysis	SERAS	11/17/10	12/3/10	Preliminary Analytical Results	10 BD after receipt of samples
Data Validation/Preparation of Analytical Report	SERAS	12/3/10 (receipt of data package)	12/24/10	Final Analytical Report	21 BD after receipt of data package

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QAPP Worksheet #17

Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach): EPA Region II personnel will determine what properties are to be sampled based on historical site data and individual access agreements. Grab samples will be collected from a specific sampling location (cistern) at a specific point in time. If there are no further releases, this grab sample may be representative of the current conditions.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [Refer to Worksheet #18 for details]: The area around the Hovensa Plant has been under investigation by the EPA and the Virgin Islands Department of Planning and Natural Resources since two accidental air releases in September 2010. There is a concern that deposits from these releases could migrate into individual home owner private drinking water supplies. Water from the select individual homes cisterns or barrels will be sampled by SERAS personnel to identify the potential and current exposure associated with release. Up to 35 water samples will be collected from cisterns in the vicinity of an active facility which has had accidental air releases. Analysis is to be performed in accordance with SERAS Draft SOP #1803, *Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM*. One 1-liter sample will be collected from each cistern, either directly or using dedicated Teflon bailers.

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QAPP Worksheet #18
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ()	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference¹	Rationale for Sampling Location
30 units TBD*	Water	Surficial	TPH	Low	30 (1 per house + 5% collocated)	2013	Biased based on impact from release

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #21)

*Unit information to be added once information is disseminated to the WAM from the Region.

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QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference ¹	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
Water	TPH	Low	1803	1 Liter	1-Liter amber jar	HCl or H2SO4 to pH ≤2, Wet Ice	7 days/40 days

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

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QAPP Worksheet #20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference¹	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of MS	No. of Trip Blanks	No. of Field Blanks²	No. of PT Samples	Total No. of Samples to Lab
Water	TPH	Low	1803	30	2	2	N/A	1	N/A	35

¹ Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

² One field (bottle) blank will be collected per lot of bottles used since dedicated equipment will be used for sampling.

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QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Check if yes)	Comments
2013	Surface Water Sampling	SERAS	Teflon construction	<input type="checkbox"/>	
2002	Sample Documentation	SERAS	NA	<input type="checkbox"/>	
2004	Sample Packaging and Shipment	SERAS	NA	<input type="checkbox"/>	
2005	Quality Assurance/Quality Control Samples	SERAS	NA	<input type="checkbox"/>	
4005	Chain of Custody Procedures	SERAS	NA	<input type="checkbox"/>	

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QAPP Worksheet #22

Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference ¹
pH paper	N/A	N/A	N/A	Inspect for usability	Prior to use	Visual	Replace if unusable	Field sampler	2013

¹Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21)

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QAPP Worksheet #23

Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
1803	Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM.	Definitive	TPH	GC/MS	SERAS	<input type="checkbox"/>
						<input type="checkbox"/>

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QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference¹
GC/MS	Initial 5-point, daily 50 ppm continuing cal check	Every 12 hours	%RSD \leq 30%	Perform maintenance, rerun initial cal	Analyst	1803
GC/MS	Initial calibration verification (ICV)	Immediately following an initial calibration	Percent recovery (%R) = \pm 50%	Rerun ICV. If needed, inspect system for problems, perform maintenance (i.e. ion source cleaning, column replacement, etc.), rerun IC	Analyst	1803
GC/MS	Daily continuing calibration check (CCC)	Every 12 hours	Percent difference (%D) \pm 25%	Rerun CCC. If needed, inspect system for problems, perform maintenance (i.e. ion source cleaning, column replacement, etc.), rerun IC	Analyst	1803

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

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QAPP Worksheet #25

Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference ¹
GC/MS	Check pump fluid	NA	NA	Weekly	NA	Fill when necessary	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Check MS ionization gauge	NA	NA	Weekly	NA	Adjust	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Replace pump fluid	NA	NA	Every 6 months	NA	Replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Check gas pressure	NA	NA	Weekly	NA	Adjust/replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Check carrier gas trap	NA	NA	As needed	NA	Replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Check diffusion pump fluid	NA	NA	Annual	NA	Replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Check injection port	NA	NA	As needed	NA	Clean	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	GC column	NA	NA	Monthly	NA	Clean	Analyst	SERAS SOP #4001, Logbook Documentation
GC/MS	Ion Source	NA	NA	As needed	NA	Clean	Analyst	SERAS SOP #4001, Logbook Documentation

¹Specify the appropriate reference letter or number from Analytical SOP References table (Worksheet #23)

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QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): SERAS Field Personnel
Sample Packaging (Personnel/Organization): SERAS Field Personnel
Coordination of Shipment (Personnel/Organization): SERAS Field Personnel
Type of Shipment/Carrier: FedEx
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Receiving Personnel/SERAS
Sample Custody and Storage (Personnel/Organization): Sample Receiving Personnel/SERAS
Sample Preparation (Personnel/Organization): Extraction Chemist/SERAS
Sample Determinative Analysis (Personnel/Organization): GC/MS Chemist/SERAS
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped within 5 days of collection to laboratory
Sample Extract/Digestate Storage (No. of days from extraction/digestion): Until sample results have been reported and validated
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: SERAS Hazardous Waste Coordinator
Number of Days from Analysis: 30

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QAPP Worksheet #27
Sample Custody Requirements

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Chain of Custody records will be generated for all samples submitted for analysis. COC records will be prepared in accordance with SERAS SOP #4005, <i>Chain of Custody Procedures</i> . Samples will be shipped to the SERAS Labs within three business days of completion of sample collection for delivery the following day.
Laboratory Sample Custody Procedures (receipt of samples, archiving and disposal): A sample custodian at the SREAS laboratory will accept custody of the shipped samples, check them for discrepancies, integrity, etc. and relinquish to an analyst for analysis. Transfer of samples will be documented using internal chain of custody.
Sample Identification Procedures: The laboratory will assign a unique laboratory identifier to each sample during sample login.
Chain-of-custody Procedures: SERAS SOP #4005, <i>Chain of Custody Procedures</i>

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QAPP Worksheet #28 QC Samples Table

Matrix	Water					
Analytical Group	TPH					
Concentration Level	Low					
Sampling SOP	2013					
Analytical Method/ SOP Reference	SERAS SOP #1803					
Sampler's Name	Solinski/Volker					
Field Sampling Organization	SERAS					
Analytical Organization	ERT/SERAS Laboratory					
No. of Sample Locations	35					
QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
GC/MS Tuning (DFTPP)	Every 12 hours	Achieve mass abundance criteria	Retune	Analyst	Accuracy/Bias	Achieve mass abundance criteria
Method Blank	1/20 samples	<RL	Reextract/ reanalyze or reanalyze	Analyst/Analytical Support Leader	Accuracy/Bias	<RL
Field (Bottle) Blank	1 per sampling event		Flag outlier	QA/QC Chemist		
Internal Standards	Each sample extract	50 and 200% of internal std. EICP area	Reanalyze extract	Analyst	Accuracy/Bias	50 and 200% of internal std. EICP area
Surrogate Spike (organics)	Each sample extract	d10-Anthracene-50-150% d14-o-Terphenyl-50-150% 5 α -Androstane-50-150% d62-Triacontane-50-150%	Reextract/ reanalyze or reanalyze	Analyst/ Analytical Group Leader	Accuracy/Bias	d10-Anthracene-50-150% d14-o-Terphenyl-50-150% 5 α -Androstane-50-150% d62-Triacontane-50-150%

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MS/MSD	1 per 10 samples	RPD \pm 20%	Flag outliers	Analyst	Precision	RPD \pm 20%
Matrix Spike (organics)	1/10 samples	TPH -25-150%	Reextract/ reanalyze or reanalyze	Analyst	Accuracy/Bias	TPH -25-150%
Mass Discrimination & Resolution Check	Prior to analysis	n-C17/pristane >80% n-C18/pytane >80% Naphthalene/fluoranthene \leq 2 Benzo(g,h,i)perylene/fluoranthene \geq 0.2	If <50%, perform preventive maintenance & rerun	Analyst	Accuracy/Bias	n-C17/pristane >80% n-C18/phytane >80% Naphthalene/fluoranthene \leq 2 Benzo(g,h,i)perylene/fluoranthene \geq 0.2
Field Duplicate	1 per 20 samples	RPD \pm 20%	Flag Outliers	Task Leader	Precision	RPD \pm 20%

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☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Chain of Custody Records Sample Labels Custody Seals, Sampling Worksheets Field Change Form (if necessary)	NA	Instrument run logs Preventive Maintenance logs Instrument printouts Internal COC Records Standard Receipt Logs Data Reduction Records Data Review Records Analytical Results	Data Assessment Forms Data Validation Check Records	Final Analytical Reports Trip Reports

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QAPP Worksheet #30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Water	TPH	Low	See Worksheet #18	1803	20 days	ERT/SERAS Laboratory 2890 Woodbridge Ave Edison, NJ 08837 732-321-4252 Vinod Kansal	NA

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**QAPP Worksheet #31
Planned Project Assessments Table**

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Laboratory Accreditation Audit	Every 3 years	External	NELAC accrediting agency	NJDEP	QA/QC Officer	Laboratory Manager	NELAC Accrediting Authority
Laboratory Audit	Annual	Internal	SERAS	QA/QC Officer	Laboratory Manager	Laboratory Personnel	QA/QC Officer
Performance Evaluation Samples	Annual	Internal	SEARS	QA/QC Officer	Laboratory Manager, Columbia Analytical Services	Laboratory Personnel	QA/QC Officer

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QAPP Worksheet #32
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Peer Review	Directly on Deliverable	Philip Solinski, Task Leader, SERAS	Prior to deliverable due date	Comments directly on deliverable	Philip Solinski, Task Leader, SERAS	Prior to deliverable due date
Field Observations/ Deviations from Work Plan	Logbook	TL	Immediately	Field Change Form	TL	Within 24 hours of change
External Lab Performance Audits	Audit Report	QA/QC Officer	Within 30 Days	Corrective Action Plan	Regulatory Agency	Within 30 Days
Internal Lab Performance Audits	Audit Report	Lab Manager	Within 30 Days	Corrective Action Plan	QA/QC Officer	Within 30 Days

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QAPP Worksheet #33
QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Technical Report	Monthly	10 th of the month following performance period	Phil Solinski, Task Leader/SERAS	ERT Project Officer and Work Assignment Manager
QA Report	Quarterly	February, May, August, November	Deborah Killeen, QA/QC Officer/SERAS	ERT Project Officer and Quality Coordinator

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QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Chain of Custody Record	Reviewed by Field Sampling Personnel in field and QA/QC Group prior to final analytical report preparation	Int.	Task Leader/SERAS QA/QC Chemist/SERAS
Laboratory Data Package	Reviewed for completeness	Int.	GC/MC Chemist/SERAS QA/QC Chemist/SERAS
Analytical Report	Reviewed for accuracy	Int.	Peer Review Team
Trip Report	Reviewed for accuracy	Int.	Peer Review Team

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QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in the QAPP were followed and any deviations noted	SERAS TL, ERT WAM
IIa	COC records	Examine COC records and match with requested analyses	SERAS Task Leader & QA/QC Chemist
IIa	Lab Data Package	Examine packages against COC forms (holding times, sample handling, methods, sample identifications, qualifiers)	SERAS QA/QC Chemist
IIb	Lab Data Package	Quantify data based on QC deficiencies (precision/accuracy, %RSD, %D, etc.)	SERAS QA/QC Chemist, QA/QC Officer, GC/MS Chemist, Program Manager

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QAPP Worksheet #36
Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIb	Water	VOA	Low	Draft SERAS SOP #1016, <i>Data Validation for Routine Semivolatile Organic Compound Analysis</i> & draft SOP #1803, <i>Routine Analysis of Total Petroleum Hydrocarbons (TPH) in Soil and Water by GC/MS-SIM</i>	SERAS QA/QC Group

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☒ Worksheet Not Applicable (State Reason) EPA Region II will be responsible for assessing the usability of the data.

QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:
Describe the evaluative procedures used to assess overall measurement error associated with the project:
Identify the personnel responsible for performing the usability assessment: EPA Region II
Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: